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Original Article

'It is me who eats, to nourish him': a mixed-method study of breastfeeding in post-earthquake Haiti

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Abstract

In Haiti, initiation of breastfeeding is high, but early mixed feeding is the norm. In a situation of crisis, mothers' worries about insufficiency of breast milk, disruption of social networks and free unmonitored distribution of breast milk substitutes impact feeding practices. This study was conducted to explore the attitudes, practices and understandings of breastfeeding in the post-earthquake situation in Haiti. A mixed-method study was conducted in Léogâne, Haiti, a town close to the epicentre of the 2010 earthquake. In a household survey, 1131 mothers of children under 24 months were interviewed about feeding practices. In the quantitative component, we conducted 25 in-depth interviews and seven focus group discussions with mothers, grandmothers, traditional birth attendants, fathers and health care professionals. Mothers described breastfeeding as a challenging responsibility to ensure the infants' health. They understood breast milk as a dynamic substance, the quality of which would deteriorate if the mother's diet was poor or if the mother was afflicted with a psychosocial condition called *move san* or *colere*, 'bad blood'. To protect the child in these situations, early supplementary feeding is introduced. Only 20% of informants exclusively breastfed infants under 6 months. Because of a lack of confidence in the quality of breast milk, Haitian mothers tend to wean children earlier. The abiding concerns of Haitian mothers over the quality of their breast milk suggest a number of ways – such as dietary advice – that post-earthquake aid agencies could enhance breastfeeding support.

Keywords: breastfeeding, attitudes, infant feeding, emergencies, Haiti, cultural context.

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Introduction

Exclusive breastfeeding during the first 6 months of life and continued breastfeeding in the age of 6–11 months is the single most effective public health intervention to reduce child mortality (Jones *et al.* 2003). The World Health Organization (WHO) and UNICEF recommend exclusive breastfeeding until the age of 6 months, and continued breastfeeding along with complementary feeding until the age of 2 years and beyond (WHO & UNICEF 2003). The death of 1.4 million children per year is attributed to suboptimum breastfeeding, the vast majority of these children die in the first 6 months of life (Black *et al.* 2008). Infants below 6 months of age are six times less likely to die from diarrhoea and from respiratory infections if exclusively fed breast milk; similar levels of protection are observed for those 6–11 months of age with continued breastfeeding in addition to complementary feeding (WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality 2000).

In emergency situations, when hygiene and care practices are compromised therefore increasing the

risk of diarrhoea and other infectious diseases, breastfeeding is particularly essential (Young *et al*. 2004). Although there are no evidence-based guidelines or unified global health policy for perinatal and child health care in disaster settings (Turner *et al*. 2010), there is a consensus that breastfeeding needs to be protected and encouraged (IFE Core Group 2007). The social fragmentation that follows in the wake of a crisis may leave new mothers without the necessary support to initiate breastfeeding (Andersson *et al*. 2009) or to continue when facing malnutrition, stress and trauma (IBFAN 2005; Gribble *et al*. 2011). The widespread and unscreened distribution of infant formula have been documented across a number of emergency situations, including the Tsunami 2004 in India (Adhisivam *et al*. 2006), the Central Java earthquake in 2006 (Hipgrave *et al*. 2011), the Philippines typhoon in 2007 (Anonymous 2007), the China earthquake in 2008 (Bengin *et al*. 2010) and the internally displaced persons crisis in Pakistan in 2009 (OCHA 2009). Because of the difficulty of conducting field studies in these settings, in-depth research into the impact of free formula on the child health has been limited (McGrath *et al*. 2002). However, it is likely that the availability of formula can exert further pressure on mothers to wean prematurely (Gribble 2005). Indeed, scholars have made links between the excess child morbidity and mortality reported in the 1991 Kurdish refugee crisis and inadequate or inappropriate methods of infant feeding (Yip & Sharp 1993); similar arguments have been made following the Botswana flood in 2005–2006, in post-tsunami India and in post-earthquake Indonesia in 2006 (Adhisivam *et al*. 2006; Creek *et al*. 2010; Hipgrave *et al*. 2011).

In Haiti, mixed feeding from infancy is the norm. While, on average, the vast majority of mothers will breastfeed (96%) and continue to do so until their children's second year (the mean is 18.8 months), the duration of exclusive breastfeeding is short, e.g. 24% of children 5–6-month-olds were exclusively breastfed [Haiti Child Health Institute (CHI) *et al*. 2006]. It has been estimated that exclusive breastfeeding during the first 3 months of life and partial breastfeeding for the remainder of the first year could prevent more than 2500 deaths in Haiti due to diarrhoea and acute respiratory infection (about one-fifth of under-five deaths) yearly (Betrán *et al*. 2001; WHO 2008a).

To best support breastfeeding, maternal practices cannot be considered in isolation, but rather must be contextualised within the local practices of child care, notions of health and healing, and Haitian ethnotheology – the *Vodou*[1] system (Desrosiers & Fleurose 2002; WHO 2010) – and analysed in relation to the current social, economic and political situation (Farmer 2004; James 2008). Haiti is one of the poorest countries in the Americas; under-five mortality was 76 out of 1000 in 2009, about three times the average under-five mortality in Latin America and the Caribbean (UNICEF 2009). The social and economic challenges Haiti faces were dramatically exacerbated in 2010 when a 7.0 magnitude earthquake killed 230 000 people, left millions homeless and devastated the nation's political, technical and public health infrastructure.

Most qualitative research concerning breastfeeding of Haitian mothers has been conducted outside of Haiti – in immigrants' communities not only primarily in the United States but also in the Dominican

[1]Here we follow the Fon language spelling. Western representations of 'voodoo' fail to capture the religious sentiment or significance of the belief system and are often highly sensationalist.

Key messages

- Breastfeeding is regarded the preferred practice of infant feeding in Haitian society.
- Breast milk is viewed as a changing, unstable substance. Age of the child is the main variable influencing the consistency and therefore quality of breast milk.
- Diet is regarded as critical for breast milk quality. In crisis situations, when diet is compromised, mothers will lose confidence in their breast milk and fear harming the child, which leads to introducing formula milk and/or supplementary feeding at a very young age. This fear will impact the effectiveness of breastfeeding interventions, especially health education.

Republic. Both in and outside of Haiti, Haitian mothers consider breastfeeding to be the best way to feed an infant (Dempsey & Geese 1983; Thomas & DeSantis 1995; Roman 2007). Reasons for breastfeeding include that breastfeeding is the best nutrition for the baby, it is a 'natural' process, and it would develop a stronger, healthier baby (Thomas & DeSantis 1995). Earlier studies have showed that although there was a diversity of opinions over the nature of food taboos, diet was a central concern (Wiese 1976; Dempsey & Geese 1983; Harris 1987). Most significantly, it is clear that 'eating well' is critical for the quality of the breast milk (Roman 2007) as was the time at which it was consumed: a mother eating late in the day was believed to cause diarrhoea in the breastfed child (Kirkpatrick & Cobb 1990). Moreover, Haitian mothers also worry that breast milk can cause intestinal parasites in infants and pre-school children and transmit mother's sickness, such as diarrhoea or impetigo (Thomas & DeSantis 1995). A common disease that inhibits breastfeeding is *move san* or 'bad blood'. Bad blood, also known as colere, transforms emotional distress to a somatically experienced disorder. Farmer suggests different interpretations of the condition – bad blood being a moral barometer that submits private problems to public scrutiny, a 'cognitive rationale for turning to the increasingly early weaning . . . practically desirable' (Alvarez & Murray 1981, cited in Farmer 1988, p. 77), or 'a channel through which broader experiences of suffering could be transmitted' (ibid., p. 77).

A comprehensive search of PubMed could not identify any published research on breastfeeding in Haiti after the earthquake, so little is known about the effects of this complex emergency on breastfeeding practices. Following the disaster, UNICEF, WHO and World Food Programme issued a joint paper to call for appropriate infant and young child feeding in Haiti (UNICEF *et al*. 2011). However, the extent to which these guidelines were followed and their impact on breastfeeding attitudes and practices in Haiti remain unclear.

The following study, conducted between May and July 2011 in Léogâne, Ouest Department, Haiti, aimed to close this gap first, by exploring current breastfeeding practices and, second, by elaborating the perspectives and attitudes that underpin how mothers decide to feed their children. Because our research took place over a year after the earthquake, we were not able to draw straightforward comparative conclusions about how the crisis had impacted breastfeeding. Rather, using a mixed-method approach – involving group discussions, in-depth interviews and survey data to corroborate qualitative insights – we aimed to describe how informants grapple with the challenge of 'feeding their children well' after the earthquake and, in so doing, illuminate some potential directions to better support child health in an emergency situation (Onwuegbuzie & Teddlie 2003; Onwuegbuzie *et al*. 2009).

Research setting, subjects and methods

Research setting

Léogâne is a seaside town, with 100 000–200 000 inhabitants, about 30 km east of Haiti's capital, Port-au-Prince. It was the town closest to the epicentre of the earthquake. About 80–90% of the buildings were rendered inhabitable and destroyed in the quake, and thousands of people lost their lives. Among those buildings destroyed were government structures and health care facilities, the majority of which were poorly maintained. In the wake of the crisis, the town experienced an enormous influx of international non-governmental organisations (NGOs) and aid agencies that still dominate all domains of the public sector.

At the time of research (July 2011), more than 1 year had passed and, in general, the population living in tented camps had declined. However, in Léogâne, the living conditions had not significantly improved: roughly 13 000 people continued to live in crowded makeshift structures, with limited access to safe water and sanitation (CCCM *et al*. 2011).

Quantitative component

A structured questionnaire with closed questions was used to obtain information about basic demographic data of mother and child as well as feeding patterns. Questions were taken from the questionnaire used in the Demographic and Health Survey (DHS) to

ensure reliability and validity. Nutrition questions were based on the standard infant and young child feeding (IYCF) indicators used by WHO (WHO 2008b). For cultural and psychological reasons, we did not include deceased children in our study. The questionnaire was prepared in French and translated into Haitian Creole. It was proofread and translated back to French, pilot-tested and adapted.

No data on household level were available for the population of Léogâne. As random or systemised sampling was regarded as culturally inappropriate by our local partners, a full survey of mothers in four-quarters in Léogâne was performed: Ça Ira, Boulos, Bois Lame and Chatuley. Inclusion criteria were being a resident of Léogâne at the time of research and having a child younger than 24 months of age.

The data collection was conducted by eight female data collectors from Léogâne who were trained in a 2-day workshop at the beginning of the study. The data collectors were going from door to door, looking for children below 24 months of age and interviewing their caretakers. Questions concerning demographic data of the biological mother were only asked when she herself was present, nutrition questions were asked in any case.

After review for accurateness, consistency and completeness, the data were entered in EpiInfo (Version 3.5.3, Centers for Disease Control and Prevention, Atlanta, GA, USA). The data set was tested for plausibility and cleaned. Description of data and statistical analysis were performed by calculating prevalences.

Qualitative component

Twenty-five in-depth, semi-structured interviews were conducted with 22 mothers of children under 5, all of whom had been residing in Léogâne and with three traditional birth attendants (TBAs), who had had been serving in the community for more than 30 years each. Interviewees were recruited by various local data collectors and were selected purposively to include representation of different ages of mothers and children, levels of education, parity, breastfeeding experience and living situation. Verbal consent was provided and audio-taped. The interviews lasted between 30 and 90 min (Tong *et al*. 2007). All people who were approached for interviews or focus group discussions (FGDs) agreed to participate.

The 22 mothers who were selected for in-depth interviews were between 21 and 35 years of age. Eight were primiparae, 14 were multiparae; the highest number of children was 4. The age of their youngest child ranged from 8 days to 4 years. Of the 22 mothers who were interviewed, 8 gave birth to their youngest child before the earthquake (7 of these mothers were breastfeeding at the time of the earthquake), while 14 had their youngest after the earthquake. Thirteen mothers were breastfeeding at the time of the interview. Ten mothers had exclusive breastfeeding experience, exclusively breastfeeding their children between 1 and 6 months, while 12 mothers had been solely mixed feeding their children from birth. The majority of the mothers entered secondary school without gaining a degree, while the others had only primary education. None of the mothers had a fixed employment and most were living in makeshift shelters or in a house with relatives.

Seven FGDs, lasting 1-2 h, were conducted and, to optimally facilitate communicative exchange, involved no less than 5 and no more than 10 participants (Kitzinger 1995; Willis *et al*. 2009). Three FGDs with mothers of young children were conducted, one FGD consisted of mothers of camp population. Two FGDs were conducted with grandmothers, one group discussion with fathers and one group discussion with medical professionals employed in a health centre. Recruitment for the FGD with mothers and grandmothers was done by the local data collectors, in different quarters of Léogâne, to reflect a variety of different neighbourhoods and living conditions. The age range of mothers who engaged in the FGDs was 19–35 years and they had between one and seven children. The number of grandchildren of grandmothers ranged from 1 to 16. The age of fathers in the group discussion ranged between 29 and 63 years and they had between one and eight children. In the group discussion in a health centre, physicians and nurses took part.

A semi-structured interview guide was used with open-ended questions to explore personal narratives

about breastfeeding, experiences of breastfeeding, initiation and weaning, sources of knowledge about breastfeeding, attitude towards wet nursing and obstacles of breastfeeding. Interviews and focus groups were conducted in French, translated to Creole by a translator fluent in both languages, answers given in Creole (or, in some cases, in a French–Creole mix) and translated back to French. Both the interviews and the group discussions attracted interest and observers, who mostly listened quietly to the interview, but sometimes engaged in the discussion. The interviews and FGD were audiotaped and transcribed verbatim. Interviews and FGD were conducted by JD, a physician, with training in qualitative interviewing. While conducting the research, she was working in a health centre as physician, supporting the local staff and attending consultations and living in Léogâne. Interview and FGD data were, therefore, supported by insights generated through participant observation (Atkinson & Hammersley 1994; Paterson *et al*. 2003). Informants have been anonymised in this paper.

Ethical considerations

Fieldwork was guided by the Code of Ethics of the American Anthropological Association (AAA 1998); informed consent was obtained by all study participants. Participants were assured confidentiality, anonymity, voluntary participation and no adverse effects in case of refusal. The study was approved by the ethics committee of the MSPP (Ministère de la Santé Publique et de la Population), the National Ministry of Health.

Results

For the survey, caregivers of 1141 children were approached, 10 caregivers rejected participation, so 1131 were interviewed. Forty-three questionnaires were excluded because of missing date of birth, or age of child above 24 months, so 1088 questionnaires were analysed. Of 902 children, the biological mother was present at the interview. Demographic data of the survey participants are shown in Table 1; feeding patterns are shown in Table 2.

Table 1. Demographic data of survey participants

Mean age of mother ($n = 897$)	27.1 years (SD 6.5)
Mean age of youngest child ($n = 1088$)	11.9 months (SD 6.8)
0–5.9 months	21% (232/1088)
6–11.9 months	32% (352/1088)
12–17.9 months	22% (236/1088)
18–23.9 months	25% (268/1088)
Mothers' education	
Did not attend school	12% (112/897)
Primary	38% (337/897)
Secondary	48% (431/897)
Technical school/university	2% (17/897)
Housing	
Makeshift shelter	45% (402/902)
Stone	20% (183/902)
Tin	15% (136/902)
Wood	13% (121/902)
Tent	7% (60/902)

SD, standard deviation.

Why do women breastfeed: the meaning of breastfeeding

In Haiti, breastfeeding is the norm. A total of 95% of children who were included in the survey were breastfed during their lives. The main reason given for breastfeeding in interviews and FGDs was to ensure the growth and healthy development of the child. During discussions and interviews, informants – mothers, fathers, and grandmothers equally – associated breastfeeding with giving 'strength to the baby' and 'making him grow'. Emphasis was placed on the development of the child's motor skills and, in particular, walking: children 'who do not have yet the strength' to walk should be continued to breastfeed until they can. Furthermore, continually referred to as the 'obligation to give the breast', breastfeeding was viewed as a duty. The experience of breastfeeding was often described with examples of the adverse circumstances under which the breast was given, for instance: during illness ('even when I was sick'), while postponing own needs ('even though I had to neglect myself') and demanding physical strength ('although it was black in front of my eyes, and I was seeing stars'). The affective dimensions of breastfeeding – i.e. closeness, bonding, love – were seldom mentioned. When emotional needs were discussed, they were described in relation to children denied breastfeeding, who were regarded as lacking maternal care. In

Table 2. Feeding patterns of youngest child

Children ever breastfed	
Children at the age of 0–23 months who received any breastfeeding in their lives	95% (1030/1088)
Timely initiation of breastfeeding	
Children at the age of 0–23 months who were put to the breast within 1 h of birth	83% (830/1004)
Exclusive breastfeeding under 6 months (IYCF indicator)	
Exclusively breastfed children 0–5.9 months	20% (46/230)
Exclusively breastfed children 0–1.9 months	32% (20/62)
Exclusively breastfed children 2–3.9 months	22% (12/54)
Exclusively breastfed children 4–5.9 months	12% (14/114)
Continued breastfeeding at 1 year (IYCF indicator)	
Children who are still breastfed at the age of 12–15 months	62% (82/133)
Continued breastfeeding at 2 years (IYCF indicator)	
Children who are still breastfed at the age of 20–23 months	21% (41/193)
Age-appropriate breastfeeding (IYCF indicator)	
Children between 0 and 6 months who are exclusively breastfed, plus children between 6 and 23 months who receive breastfeeding and complementary feeding	46% (492/1081)
Bottle feeding (IYCF indicator)	
Children 0–23 months who were fed with a bottle the previous day	52% (563/1081)
Consumption of powdered milk	
Proportion of children (0–23 months) who ever consumed powdered milk	86% (923/1079)
Wet nursing	
Proportion of children (0–23 months) who were ever breastfed by a woman who was not their biological mother	9% (99/1082)
Free powdered milk	
Proportion of children (0–23 months) whose families received powdered milk without paying for it	4% (39/1076)

IYCF, infant and young child feeding.

the main, breastfeeding was regarded a health-related activity. There were many reasons why a mother could not breastfeed, but it was most often expressed as external powers *forcing* the mother to wean – never as a mother's choice.

The informants made a linguistic differentiation between exclusive and non-exclusive breastfeeding, although both terms are literally translated to mean breastfeeding. Exclusive breastfeeding was called *aletman*, whereas non-exclusive breastfeeding was referred to as *bay tete*. While the main health aspect of any breastfeeding was giving strength, the main reason for exclusive breastfeeding was disease prevention, as only *aletman* was associated with prevention of infectious diseases (Box 1).

Box 1. The meaning of breastfeeding

'The [breast] milk helps, it gives strength, it helps the child to hold himself.' (Mother FGD1)

'When you give the breast, the child is more solid.' (Mother W)

'Breastfeeding, that is your energy that the baby suckles.' (Mother V)

'You are obliged [to breastfeed]. When the child cries, you cannot leave him without breastfeeding.' (Mother E)

'If you do aletman, it protects the child, he will not be sick.' (Mother FGD1G)

'The milk of the mother is the best milk': the substance of breastfeeding

'My milk is the better milk' – When discussing different milks with the informants, they were very certain that, generally speaking, breast milk is the best milk for the child. This was due to the nutritional value of the breast milk: 'I think breast milk is better, because this is the milk that nourishes the baby.'

However, in the informants' view, the substance of breast milk is dynamic and unstable. It varies within individuals as well as between them. One of the main drivers of that change is the age of the child. The substance undergoes a linear process when the child becomes older: young milk was described as liquid, and the older the child – or the milk, respectively – gets, the thicker it becomes. 'The first thing the child finds in the breast is like water. Then she will find a

Box 2. Wet nursing

'The milk would not be the same, and this would make the child sick.' (Mother E)

'The milk that is bigger you can give to the smaller child, because it is heavier, it will be fine.' (Mother S)

'The milk of six months is bigger. A baby of three months can take the milk of six months, but this child can not take the milk of three months.' (Mother, Friend of TBA A)

'[Comparing the] milk of two months, and milk of three months, the milk of three months is better.' (TBA A)

little milk, clear, and the third milk is compressed.' To describe the milk of a young baby, the informants used adjectives like 'clear', 'liquid', 'like water', 'young', 'small' and 'weak'. The ascriptions for milk of an older baby were 'old', 'ripe', 'big', 'strong', 'mature', 'heavy', 'compressed' and 'dense'. The endpoint of this process is the milk becoming sweet: The milk becomes 'so compressed that it becomes sweet'. At this point, the child should be weaned, and after weaning, the milk becomes 'dry'.

The progression of breast milk from thin to dense ensures that the baby receives age-appropriate milk. The implication is that wet nursing – breastfeeding a child that is not one's own – should be avoided. This interpretation was corroborated by survey data as only 9% of children were wet-nursed during their lives. As mature, compressed milk is regarded as superior over young, liquid milk, a problem will arise if the wet-nursed child is older than the biological child of the wet nurse: the child will receive milk that is 'too thin'. While most informants were vague on the precise nature of the adverse effects of age-inappropriate milk, the suggestion was made that giving immature milk to a child could slow his mental and physical development. Another health problem most frequently mentioned was diarrhoea: milk that is too thin will result in stools that are too liquid. While age was the key factor in calibrating breast milk to the specific needs of the child, it was clear that kinship also played a role. If a mother could not breastfeed, it was preferable that a close or extended family member should act as a wet nurse, rather than another woman who happened to have a baby of the same age. Mother's attitudes towards breastfeeding in pregnancy exemplify the individuation of breast milk for the child. When the breastfeeding mother conceives again, her breast milk changes the consistency – becoming 'young' again – to meet the needs of the fetus. Informants insisted that the moment a mother learned of a new pregnancy, it was imperative to stop breastfeeding and in all the cases described during FGD and interviews, the mothers did so (Box 2).

According to the mothers and grandmothers, the quality of breast milk deteriorates at the age of 18 months, when the milk becomes so compressed and, as a result, sweet. As it is widely acknowledged that worms like sweet food, if breastfeeding is continued beyond this point, the child will become worm-infested. Thus, the normative age to wean – or, rather, to stop breastfeeding entirely – was 18 months. The second main reason to wean at that age was the achieved development of the child. As one of the main functions of breastfeeding is to support the development of the child's motor skills, once he or she can walk, breastfeeding was regarded as no longer necessary to achieve milestones. Some informants stressed the importance that a child does not breastfeed again after being weaned. In this regard, mother's had to be particularly vigilant, as there is always a possibility that the milk could be 'stolen' by the child, as he takes the breast secretly, while the mother sleeps (Box 3).

Here, it is important to note that despite this insistence on the importance of weaning after 18 months, our quantitative data from the survey show that 21% of children were still breastfed at the age of 20–23 months. It is an anthropological truism that that lived behaviour never completely tallies with normative values. In this case, mothers' decision to continue breastfeeding contrary to cultural proscriptions may have to do with a number of individual and contextual factors. The most compelling interpretation would be to read this discrepancy in stated and actual practice in relation to the conditions of life in an emergency setting, which, while we do not have the necessary data on breastfeeding before the earthquake, we will discuss in greater detail below. At this point, we merely wish to underscore the importance of these

Box 3. Weaning

'18 months. And I always heard people say that at 18 months, you pull out. You do not give the breast any more.' (Mother E)

'The milk is becoming too big for the baby.' (Mothers F and Q)

'The milk is too heavy, it can give him worms [. . .] you should not breastfeed him any longer, he will have worms immediately, the milk is sweet.' (Mother O)

'When it works well with the child's physique, that the child is physically well, she can walk, she can do what she wants, she holds herself normally: Then you can stop breastfeeding the child.' (Mother B)

'After finishing [breastfeeding], you must not let the child take the breast in a hidden way, while you are sleeping; this will make him sick.' (Mother D)

ideas about the timing of weaning in mother's discussion of good breastfeeding practice.

Apart from the development of milk over time, there are other factors that influence the quality of milk, the most important of which being the mother's diet. What foods to eat or avoid was the topic that dominated the interviews and group discussions: to breastfeed, mothers have to 'eat well, drink well'. Although informants agreed on the importance of 'eating well', there were different opinions about the details of a good diet. Millet (*pitimi*) and ground maize (*mayi moulen*) are the most important elements of the diet of a breastfeeding mother: 'The millet is absolutely necessary.' Other good foods that were mentioned frequently were black beans, beans in sauce, vegetables and bouillon. Food and drink will influence both quantity and quality of the breast milk. Exclusive breastfeeding was regarded as impossible without 'eating well'. Food was roundly believed to have a strong impact on the quality of milk, but there was a wide degree of variation on which foods were believed to be harmful to the child. Many informants mentioned mushrooms, okra, coconut and tomatoes. Other harmful food included white beans, cabbage, potatoes, grapefruit, goat meat, avocado, peanut butter, butter, eggs and carbonated drinks. Several informants regarded all white food as potentially dangerous: white beans, milk, pork meat and white fish meat.

The effect of banana, papaya, breadfruit and wheat on the quality of milk was the subject of some controversy. The benefits of these and other staple foods in the Haitian diet – rice, beans, fish, mango and coconut – depended on the manner of preparation, amounts of consumption, species, origin or age of breastfed child.

Breastfeeding mothers should also eat at the right time of the day. Eating 'too late' could also lead to diarrhoea or the same somatic disturbances as produced by consuming inappropriate food. Given the importance and the complexity and inconsistency of the diet rules that constitute 'eating well, drinking well', it is not surprising that the mothers' trust in their breast milk was undermined. Although, in general, breast milk was best for the child, with modifications in diet, mothers feared their milk deteriorate in such a way that breastfeeding would actually be harmful for the child. Breastfeeding when milk was of poor quality was particularly dangerous for a child exclusively breastfed. As their economic situation prevented many mothers from purchasing 'good food', most decided to back up their milk with powdered milk as they feared the quality of their breast milk was questionable. In short, while mothers regarded their breast milk as superior to powdered milk, when the former was compromised by poor diet, a child should be offered the latter. Coherent with that attitude expressed in interviews and FGDs, the data of our survey showed that only 20% of children under 6 months were breastfed exclusively at the time of research. As one informant commented: 'If you eat badly, you drink badly, it's your duty to give the child something other than breast milk.' A mother of a 6-week-old baby, who was exclusively breastfeeding, had this strategy in mind if her economic situation deteriorated: 'They told me to do aletment for him. After three months I will see if I have enough money to eat well. If not, I will give him powder milk.' Apart from these concerns about the quality of the milk, other reasons for mixed feeding – for instance, aesthetic reasons or separation due to work – were rarely given, and when they were, they were attributed to the

Box 4. 'Eating well'

'It is me who eats, to nourish him.' (Mother FGD2C)
'You have to eat well, drink well. Without that, you will not be able to breastfeed.' (Mother W)
'If you do aletman, and you do not eat well, drink well, this is not good for the baby.' (Mother K)
'When she [the mother] does not eat well, the child finds no milk.' (Grandmother FGD4G)
'Ground maize, beans in sauce, millet, with congo beans in sauce, that gives a lot of milk to do aletman.' (Mother Q)
'If you do not eat well, the milk will become like water.' (Mother P)
'Millet, ground maize, beans in sauce, that will give a fat baby, a well formed baby, a baby, that can develop.' (Mother FGD5E)
'If you eat too late, no matter what, this will disturb the milk.' (Mother S)
'They say, the breast milk is better for the child. But I did not have money, and I saw that the child took the breast too much, and I did not eat well. So I gave him the bottle, because I had nothing to eat.' (Mother R)
'The doctor told me it is better to give the breast to the child, because the breast allows the child to develop better, to protect against disease. I could not do that, because I could not eat at the right time, so I could not do aletman.' (Mother FGD1AD)

dubious practices of 'other mothers', indicating that these reasons were not socially acceptable (Box 4).

In our survey, it was shown that 86% of the children under 2 years of age had received powdered milk during their lives. The powdered milk given to infants in Léogâne was, in most cases, unmodified powdered milk that could be purchased in the pharmacies and was stored in the same shelves as infant formula. Only few informants were aware of the difference between unmodified powdered milk and infant formula. In our survey, 31% of children under 6 months of age received unmodified powdered milk during the time of research [in the survey, informants were asked the name(s) of the brand(s) of milk that they were feeding their children]. Feeding formula to the infant was regarded as cheaper than buying 'good food' for the mother. Often, the whole financial network of a family was activated to pay for the child's formula, the father playing an important role.

In addition to the problems of a poor diet, Haitian mothers believe their milk may be tainted by a condition called 'bad blood'. Informants described 'bad blood' (*move san* or *colere*) as a common disease that can compromise breast milk. All informants were aware of the condition, but grandmothers and TBAs understood its prognosis and aetiology in greater depth. In the course of the disease, the systems of blood and breast milk becomes unstable, making it imperative to interrupt, if not bring to a complete halt, breastfeeding. The condition is caused by a disturbance of mood. This was most often associated with an interpersonal conflict, in many cases within the family of the mother; our male informants identified jealousy as the leading cause. Others linked the onset of bad blood to poverty. Along these lines, one informant insisted that if the economy improved and extreme poverty was no longer a problem, then bad blood would cease to exist. While the effect of the earthquake on the incidence of bad blood was not rendered explicit, it was clear from the discussions that the crisis had created the conditions in which cases of bad blood would arise.

In the case of bad blood, the systems of blood and of breast milk inside the female body become unbalanced. As to the exact nature of that disturbance – its symptoms and prognosis – there was a diversity of views; however, many informants agreed that in the case of bad blood, blood and milk – liquids that are separated within the body in normal circumstances – meet, and 'the blood will mix with the milk'. The milk will leave the breasts and go to other places in the body, most often the head. Blood and milk will fight with each other. The symptom of the condition in the mother most frequently mentioned was 'becoming crazy'. Bad blood can also cause headache, a stiff body, visual impairment and pimples (*boutons*). However, its effects are felt more by the breastfeed baby than the mother. Bad blood causes the milk to spoil (*gate*) and its consistency to alter. As in other conditions where the milk is 'too thin' for the child, the child will suffer from diarrhoea. Skin affections of the child were also mentioned frequently, as well as the child becoming mentally ill or developmentally delayed. Some informants mentioned that the child could die, both from physical death as well as from death of the spirit. A small minority of informants

Box 5. Bad blood

Causes of bad blood

'I had a dispute with the father of my children on the phone. He told me something on the phone, I had to cry. I was not aware that I had bad blood.' (Mother X)

'You can make bad blood if you talk too much, if you discuss too much.' (Mother W)

'If you think too much, if you reflect too much.' (Mother FGD2C)

'Sometimes I sit and think. Nobody gives me [money], I have nowhere to go to get help, I see that I am in misery with my child, this makes me cry and have bad blood.' (Mother FGD2C)

'In some surroundings, breastfeeding mothers will not make bad blood, because everything is fine, she will not have disputes, there is no need to make bad blood.' (Mother FGD5E)

Mechanisms of bad blood

'The milk can rise in the head when you make bad blood.' (Mother T)

'If you have colere, this is the one against the other [blood against milk], may it be the one or the other that dominates, but if the milk dominates, the person will become a fool.' (Grandmother FGD3)

Consequences for the child

'As the child takes the breast and is not habituated to the milk of bad blood, it can make him severely sick.' (Mother FGD2V)

'You make bad blood, the milk becomes like water, this will disturb the child . . . he will have diarrhoea.' (Mother Q)

'I was having bad blood. In my experience, it gives me pimples, and when I breastfeed the child he has also pimples on his skin, and it gives him diarrhoea.' (Mother R)

'It will give him [the child] diarrhoea, but it is good for you, because he takes the bad blood away from your breast.' (Mother S)

Treatment of bad blood

'If you make bad blood, you look for the elderly, they know the leaves, they give you the leaves to make a bath . . . , they bathe you . . . the elderly always know what to do, afterwards your skin is like before.' (Mother V)

'The doctor [in the hospital] could give me a calmative, but he was not aware that it was bad blood. When you go to a herbal healer, he will discover that it is bad blood.' (Mother X)

stated that in spite of the negative consequences for the child, breastfeeding should be continued, as it will drain the disease off the mother's body. However, most believed that breastfeeding should be ceased immediately and among the women interviewed who had been affected by bad blood, all decided to wean. Stopping breastfeeding due to bad blood was often viewed in the best interest of the child and was one of the few situations where weaning before the age of 12 months was deemed acceptable (Box 5).

Knowing breastfeeding: sources of knowledge

Mothers formed their attitude towards breastfeeding from a variety of sources, including health staff in hospitals, health centres and NGOs, the elder members of the community, the herbal healers and TBAs. Elder female community members, who saw it as their particular responsibility to give advice to young mothers, were regarded as a valuable source of information on childcare and nutrition. In several interviews and group discussions with mothers, elderly women voiced their opinion strongly and were never contradicted. Drawing information from 'traditional' and biomedical sources, mothers readily integrated and synthesised understandings belonging to seemingly exclusive worldviews. For instance, traditional Haitian knowledge does not support the concept of exclusive breastfeeding of all infants: while some children are believed to be 'suitable' for this practice, others are not. Medical practitioners, in contrast, advise exclusive breastfeeding for all children (disregarding a small number of contraindications) until the age of 6 months. Thus, the practice of exclusive breastfeeding was clearly associated with biomedical medicine; all the informants who were exclusively breastfeeding for 6 months had intense contact with the biomedical care system, and all of them related their behaviour to the advice they had received (Box 6).

Another point on which traditional and biomedical models of health diverge is on the appropriate timing of initiation. While hospital staff will advise that breastfeeding should start within the first hour after delivery, traditional practitioners (i.e. grandmothers and TBAs) council mothers to give a purgative (*lok*) to the children first. However, the vast majority of young mothers who participated in interviews and

Box 6. Knowing breastfeeding

Exclusive breastfeeding

'The doctor does not want that you give powder milk. He told me to do aletman.' (Mother E)

'She [nurse in hospital] told me to give only the breast. To give no water and no food. I accepted and did everything she told me to do, until last Saturday, when he was six months of age.' (Mother H)

Initiation

'The first food of a baby is palm oil, with nutmeg, orange and bicarbonate . . . after that the baby will have his first stool . . . olive oil, almond oil, palm oil, orange, bicarbonate, garlic, a pinch of sugar . . . you boil it, and this makes the child push out the stool.' (Grandmother FGD3)

'If you give the milk before giving the lok, he [the baby] will die.' (TBA C)

'As first thing after delivery [in hospital], they have asked me to give the breast.' (Mother W)

Integration of knowledge traditions

'My milk is full of vitamins. I eat all the fruit, so it has vitamins.' (Mother Q)

'If you make bad blood, the child will take it in the breast. It . . . can cause scars on the skin, the child can become allergic with the water.' (Mother O)

'You make bad blood, that can cause diabetes, cardiovascular disease, many kinds of disease, pressure, sugar.' (Mother FGD5E)

discussions reported having initiated breastfeeding right after delivery and having refrained from administering the *lok*, which was confirmed by our survey data, which found 83% of mothers to have initiated breastfeeding within the first hour after delivery. These reports reflect an increase of institutional deliveries in Léogâne – in our survey, 59% of deliveries before the earthquake were home deliveries, after the earthquake, this rate declined to 22%. Although the behaviour of administering *lok* decreased, the idea of cleaning the baby was still present in many informants – but it was the breast milk instead of the *lok* that had to fulfil this task: 'The breast washes the belly, it makes the stool come out.' Biomedical concepts were also integrated in the practise of *lok*: 'It is necessary that the microbes go out of the belly first.' – and elaborated in relation to traditional ideas about the importance of food – because breast milk was rich in vitamins, mothers described the purpose of 'eating well' as consuming more vitamins. The condition of bad blood was also connected with biomedical concepts of disease, such as allergies and cardiovascular conditions. However, in the biomedical settings, such as health care facilities, mothers did not mention the knowledge 'that comes from the grandparents'. Many mothers knew what biomedical physicians expected them to do concerning breastfeeding, and wished to fulfil these expectations: 'If you go to a [biomedical] doctor and tell the doctor that you are exclusively breastfeeding, the doctor is very satisfied.' The reluctance to discuss traditional beliefs meant that health staff had actually little or no knowledge about them; when these were discussed in a group discussion with medical staff, they responded: 'we are learning a lot of new things from you.'

Breastfeeding after the earthquake

Opinions about the difficulties that were experienced by lactating women in the immediate post-earthquake situation varied widely. Many informants said there were no difficulties concerning breastfeeding and regarded their own bodies as an important resource, which they could draw on to support their children despite the difficult context of living. Others suggested that the earthquake had a significant impact on their capacities to feed. Women who were breastfeeding their children at the time of the earthquake mentioned a lot of stressors: worries for missing family members, hunger, hot climate in the provisional tents, and, above all, insufficient funds to buy 'good food'. In many cases, this led to mixed feeding, as formula was believed to be cheaper than 'good food' and less risky than milk compromised by poor diet. The increased levels of obligation and sacrifice to the child after the quake was a prevalent theme and many women said they turned to traditional medicine as resource in these desperate times. While informants reported no elevated prevalence of 'bad blood' after the earthquake, there perception that 'bad blood' is in most cases caused by financial and interpersonal problems suggests that women saw themselves as more susceptible to the disease after the quake. However, the obstacle that focussed dis-

Box 7. Breastfeeding after the earthquake

'I did not find my husband, I was very stressed, so I could not find milk in the breast. After the earthquake, my breasts were dry.' (Mother B)

'Yes, I had big problems, but I breastfed anyway.' (Mother S)

'You could not find anything to eat for the child, so you were obligated to give the breast.' (Mother T)

'My mother gave me compresses, she knows about leaves, and she gave me leaves.' (Mother B)

'Here in Haiti we give treatment like teas; we believe that there are important things in tea. Especially after a big catastrophe the traditional medicine is very important. It helped a lot in breastfeeding.' (Father FGD6K)

'Everything we had was gone in the earthquake, but the milk did not go, the milk is within ourselves.' (Grandmother FGD3GM)

'Less people did breastfeeding, because after the earthquake no one had money, no one could eat well to give the breast to their children, so less people did breastfeeding.' (Grandmother FGD4)

'If the mother did not find anything to eat, she was buying a tin of milk.' (Grandmother FGD4)

cussion was the lack of 'good food' and the worries that without it, the child could suffer from inadequate milk (Box 7).

Discussion

This study has shown that in post-earthquake Léogâne, breastfeeding is regarded as the preferred way of infant feeding and, accordingly, 95% of children received breastfeeding. However, despite that stated preference, mixed feeding is the norm. Breast milk substitutes and other forms of milk powder are often used and complementary feeding is introduced early – only 20% of infants below 6 months of age are exclusively breastfed – the most often mentioned reason being a manifold of concerns about the quality of breast milk.

Because the substance of breast milk is regarded as dynamic and varies with age, wet nursing is not practised – indeed, only 9% of children in Léogâne had been nursed by anyone other than their mothers. Apparently, there was no widespread distribution of breast milk substitutes in Léogâne – only 4% of children below 2 years of age received breast milk substitutes for free. The normative age of weaning is 18 months; 62% of children are still breastfed at the age of 1 year and 21% at 2 years of age. Biomedical understandings and traditional Haitian knowledge about breastfeeding were both prevalent in Léogâne's mothers, with several ways of integrating – and separating – the one from the other, forming a body of knowledge that can be described as 'medical syncretism' (Muela *et al*. 2002).

Limitations of our study include the fact that deceased children were not included, and thus due to the survivor bias, certain practices may be under- or overestimated. Representativeness of the quantitative data is limited, as a full survey was conducted in four-quarters of Léogâne instead of random or systemised sampling in the whole town. Qualitative data are limited by language barrier and by limited time to conduct research. It became clear that Vodou can interfere with breastfeeding, but access to the topic of Vodou was limited – informants discussed the religion reluctantly (cf. DeSantis & Thomas 1990). Artificial feeding was not discussed with the informants in depth. It is imperative that further studies in Haiti about breastfeeding also explore the topic of artificial feeding, as any breastfeeding intervention must acknowledge the high rates of bottle feeding and the underlying reasons.

Our study showed that many beliefs and attitudes that have been described in other qualitative research studies are still adhered to in the post-earthquake situation. Comparison with earlier quantitative breastfeeding data is difficult as only data on the national and department level are available and no local data of Léogâne could be accessed. Data of the last DHS in 2005/06 showed a rate of ever breastfed children of 94% – as high as that we showed in our survey. The rate of initiation of breastfeeding within 1 h after delivery was 47% in the Ouest department and 83% in our survey in Léogâne – coherent to our findings in the interviews and FGD. The rate of exclusive breastfeeding in the different age groups (0–1.9, 2–3.9 and 4–5.9 months) in Léogâne is about half as high compared with the last national data. Although comparability of the data is limited, it can be assumed that the earthquake and the following worries of mothers concerning the quality of their breast milk

might have contributed to the reduction of exclusive breastfeeding.

The current recommendations of the WHO concerning breastfeeding comprise initiating breastfeeding within the first hour after delivery, exclusive breastfeeding in the first 6 months of life and continued breastfeeding until the age of 2 years and beyond (WHO & UNICEF 2003). Although these recommendations have been the subject of some debate (e.g. Fewtrell 2011), in a post-crisis situation, where access to basic necessities – e.g. clean water – is highly compromised, the benefits of breastfeeding are clearly indicated. The high rate of initiation and the general conviction that breast milk generally is the best feeding option for an infant suggest that there are reasons to be optimistic about sustained rates of breastfeeding after the earthquake. However, the diet regulations for lactating women present an obstacle to implementing WHO recommendations; as the lack of access to 'good foods' undermines mothers' confidence in their breast milk and leads to early introduction of mixed and complementary feeding. Furthermore, the emphasis on the specificity of milk for the individual child presents a barrier to relactation and wet nursing, both practices that are recommended by the IFE group to consider in emergency situations (IFE Core Group 2007).

The health education that has already taken place in Léogâne to encourage women to breastfeed and to support the continuation of breastfeeding practice needs to be reinforced. Attitudes have been shown to be subject to change, as the reframing of colostrum as purgative shows impressively: a Haitian NGO used the slogan – *The first milk is the best purgative* – to discourage the use of *lok* (Roman 2007). Repeated by the medical health staff in Léogâne, this slogan found traction with informants, who had, subsequently, changed their practices. Many women are familiar with the recommendations for exclusive breastfeeding for 6 months – indeed, even draw the distinction between exclusive and non-exclusive breastfeeding linguistically – but ideas about diet remain unexplored by the medical staff that recommends exclusive breastfeeding, regardless of what mothers are eating.

The success of health education depends on the degree to which it builds upon traditional knowledge (Lee & Garvin 2003). Health messages must be framed in response to the local context, taking into account not only economic circumstances, but, drawing upon participatory methods, also the everyday practices and understandings around of health and wellbeing. Haitian mothers are not 'passive vessels' that can be 'filled' with biomedical facts; rather, they based their decisions on a combination of different systems of knowledge and logics of practice (Muela *et al*. 2002). For instance, breastfeeding may seem economically advantageous compared with breast milk substitutes, but according to our informants, the special diet required for breastfeeding means that 'mothers need a lot of money to breastfeed'. Furthermore, it should not be assumed that education that will focus on individual caregivers will lead to a behaviour modification, as traditional 'teaching' techniques will ignore power dynamics within the health consultation network – as elder community members, grandmothers, traditional midwifes and herbalists are an important resource of knowledge, are consulted when breastfeeding problems occur and were observed within the process of research to dominate discussions about the topic, they have to be included in any educational efforts (Kerr *et al*. 2008). A previous study in Senegal involved grandmothers in promoting improved infant feeding practices successfully and showed that 'the guardians of tradition are not averse to change' (Aubel *et al*. 2004). In other cases in West Africa, for instance Burkina Faso, women changed breastfeeding practices according to recommendations only when alone with their infants, as the risk of being stigmatised by grandmothers and husbands limited mothers' legitimacy to decide what is good for their infants (Desclaux & Alfrieri 2010).

The influx of humanitarian aid after the earthquake in 2010 in Léogâne has not repeated earlier mistakes concerning breastfeeding in complex emergencies, such as the widespread, unscreened distribution of formula milk. However, the obstacles to breastfeeding remain and the full potential of breastfeeding education and support has yet to be tapped. Our study stresses that for breastfeeding support after emergencies, it is important to come to terms with the nuances in the local understandings on breastfeeding. In Haiti, the main barrier to breastfeeding after the

earthquake was lack of confidence in the quality of breast milk and the impact of degraded milk on children's health. In a crisis situation, numerous stressors, such as lack of support, as well as exhaustion and emotional stress may inhibit breastfeeding, but in our study, we could show that in Haiti, these stressors are articulated through the idiom of the dietary norms. The earthquake acted as a magnifying glass, under which all fears around the consistency of milk become enlarged and thus more clearly visible.

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Conflicts of interest

The research for this paper was done by JD as part of her Master of Science in International Health programme at Charité, Berlin, Germany. The authors declare that they have no conflicts of interest.

Contributions

JD designed the study, collected the data, analysed the data and drafted the manuscript. AHK assisted in all phases of coding and analysis and participated in writing, critically reviewing and editing the manuscript.

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